We claim:

1. A method for detecting a target nucleic acid comprising:

(a) providing first and second target-specific nucleic acids, wherein the first and second target-specific nucleic acids each comprise sequences complementary to the target nucleic acid; wherein the first target specific nucleic acid is bound to a first affinity tag and the second target-specific nucleic acid is bound to a second affinity tag, wherein the first affinity tag is capable of binding to a molecular motor, and wherein the second affinity tag is capable of binding to a detection probe;

(b) contacting the first and second target-specific nucleic acids to a sample under conditions whereby the first and second target-specific nucleic acids will hybridize to the target nucleic acid if the target nucleic acid is present in the sample, wherein upon hybridization to the target nucleic acid the first and second target-specific nucleic acids are directly adjacent to each other;

(c) ligating the first and second target-specific nucleic acids together;

(d) binding the molecular motor to the first affinity tag and the detection probe to the second affinity tag;

(e) inducing movement of the molecular motor; and

(f) detecting movement of the molecular motor through the detection probe, wherein the movement of the molecular motor serves to detect the target nucleic acid in the sample.

2. The method of claim 1 wherein the method further comprises generating a plurality of ligation products following step (c) using ligation chain reaction.

3. The method of claim 1 or 2 wherein the molecular motor comprises an F1-ATPase.

4. The method of claim 3, wherein the inducing comprises contacting the molecular motor with ATP.

5. The method of any one of claims 1-4 wherein the detection probe comprises an elemental metal nanorod.

6. The method of claim 5, wherein the detecting comprises visual detection by dark field microscopy.

7. The method of any one of claims 1-6 wherein the detecting comprises determining an oscillation of intensity of light at one or more wavelengths from the detection probe.